The adult females work diligently manipulating the larvae for food, but they are not able thus to feed themselves as the *Scelerodermi* can, but require other food. It has been necessary for me in working with them to feed them with honey in order to keep them alive.

Two males of this species were taken on my office windows and one of these placed with a very large female soon mated with her and mating was repeated several times.

16. Distinction between Holepyris hawaiiensis and H. hospes.

There has always been some difficulty on my part in distinguishing between these species from the descriptions. I have therefore drawn up a summary of the characters by which the females may be distinguished.

I have never seen a male of *H. hospes*.

Holepyris hawaiicnsis (Ashmead). Smaller; antennae dusky at tip; punctures of head finer; submedian ridges of propodeum nearer the median, more distinct and shorter; the area lateral to them more finely striate anteriorly and more coarsely posteriorly.

Holypyris hospes Perkins. Larger; antennae not dusky at tip; punctures of head larger and more distinct; submedian ridges of propodeum farther from the median, less distinct; lateral areas more evenly and finely striate.

A New Lowland Plagithmysine Cerambycid from Oahu with Notes on Its Habits (Coleoptera).

BY JOHN COLBURN BRIDWELL.

The insect fauna of the lowlands of the Hawaiian Islands is now made up largely of immigrant forms brought in through the operations of commerce. With the advent of the European and Asiatic races in the islands and the introduction of the cultivated plants and weeds and the development of herds of cattle the native vegetation began to disappear from the lowlands, surviving only on some of the

dry ends of the lower spurs of the mountains, in the sides of the gulches, in the marshes, along the sea shore and in some of the more arid regions where the lack of surface water checked the wanderings of the cattle.

The endemic insects, being as a rule but little adaptable to new host plants, receded with the plants to which they were attached.

With the spread of cultivation and the introduction of hundreds of species of plants for economic purposes or for ornamental plantings for many years entirely without any system of port examination and quarantine, many insects attached to these plants were introduced and became established. Some of these entered into direct competition with endemic lowland insects. Other insects, however, which were parasitic and predaceous upon the introduced insects soon adapted themselves to attack the endemic lowland insects and reduced their numbers. Among these one species is doubtless more important than all the rest. The ant, *Pheidole megacephala*, is eminently predaceous in its habits, attacking other insects indiscriminately and wherever it has spread the endemic insect fauna has practically disappeared, only a few Hymenoptera, such as species of *Crabro, Odynerus* and *Nesoprosopis*, some Coccidae, Jassidae, and Delphacidae among the Homoptera, some Heteroptera, some Lepidoptera and possibly some Diptera have been able to survive where this ant is able to maintain itself in its full numbers. But none of the characteristic groups of endemic Coleoptera are able to persist where it is found since they are generally sluggish, of feeble powers of flight, and defenseless against the attacks of the myriads of ants present in the cultivated area of the islands.

It has been generally recognized that the cooler and generally damper climate of the mountains forms an impassable barrier to the spread of *Pheidole*, but it is not so well known that there are certain of the dryer areas of the lowlands in which it is unable to maintain itself. Since these

regions are also the ones upon which the native lowland vegetation has persisted it is natural that the native insects should survive here, if at all.

On the Island of Oahu, these arid regions are found at the extreme southeastern end in the vicinity of Makapuu point, and again on the western side of the island from Kaena point along the Waianae coast to Barber's point, and thence eastward to near the Pearl River Inlet. In general these regions are difficult of access, without good roads and without water, so as to make camping difficult, and the surface is irregular and difficult of passage for pedestrians, owing to the growth of the glue (*Acacia farnesiana*) and algaroba (*Prosopis juliflora*) which cover their surface. The native vegetation is scattered and as a rule there is but little to repay the insect collector for his trouble in working there. Such conditions have led to a very general neglect by entomologists of these regions and they have been but little investigated excepting the Waianae coast and the vicinity of Koko Head.

In 1916, Mr. C. N. Forbes, the botanist of the Bishop Museum, called my attention to the region to the south of Ewa Mill and Sisal as a region where some of the endemic lowland plants have survived, and in November of that year the writer acompanied him on a collecting trip there.

He was rewarded by finding there an undescribed Jassid of the genus *Nesophrosyne* attached to a form of *Euphorbia multiformis* growing there, and rediscovered the endemic *Plutella alborenosa* Walsingham, discovering the feeding habits of its larva. It is attached to the endemic caper, *Capparis sandwichiana*, the young larva mining under the cuticle of the green fruits, while the older larva burrows in its fleshy walls, emerging to spin a characteristic *Plutella* cocoon.

In 1918 Mr. O. H. Swezey and Mr. P. H. Timberlake visited the same region, finding there the Conoiopterygid, *Coniocampsa vesiculigera*, which has rarely been taken. The writer again visited the region on June 8 and 10, 1919, finding a new Plagithmysine Cerambycid, described on a later page

as *Neoclytarlus euphorbiae* and *Proterhinus deceptor* Perkins which had previously been taken by Mr. Timberlake on Diamond Head. Both belong to particularly characteristic endemic Hawaiian groups of beetles and are the first species of these groups to be discovered on the lowlands. Material was brought in from which a second endemic species of *Plutella* attached to *Capparis sandwichiana* described elsewhere in these Proceedings as *P. capparidis* by Mr. Swezey, and a new Bethylid representing a new genus, described in another paper as *Nesepyris ewa*.

On June 30, 1919, Mr. O. H. Swezey, Mr. E. H. Bryan, Jr., and the writer visited the same general region, going by train to Gilbert and walking by one road to the lighthouse at Barber's Point, returning by another route to Gilbert, finding some endemic Delphacids, a Jassid attached to *Myoporum* and an *Oliarus* which had previously been taken by Mr. Swezey at Ewa Mill and the only lowland species of the genus known from these islands. Here also was taken a second species of *Proterhinus* (*P. excrucians* Perkins).

The writer visited the region near Sisal again on July 6, 1919, and many times subsequently during 1919.

These are apparently the only entomological investigations which have been made in this region, which for the want of any comprehensive name the writer has called the Ewa Coral Plain. The results of these visits have been so interesting and since the region promises to furnish further members of the old lowland fauna, it is worth while to discuss the conditions there somewhat fully.

The Ewa Coral Plain is made up of an old coral reef which extends from the Pearl Harbor Lochs and the inlet connecting them with the sea to Barber's Point for a distance of about eight miles, extending inward from the sea for a mile and a half to two miles. Nearly parallel to the southern shore and about a mile from it, extends an old solid barrier reef in which are the characteristic pits such

as are found in the fringing reefs at Kewalo and Waikiki, and generally where coral reefs lie near the surface. These pits are of varying sizes. They may be only a foot or so wide, even fifteen feet in depth and in the larger ones there are traces of the bread-fruit, the paper mulberry, the ti, yams, noni, native sugarcane, and other plants such as *Ipomoea tuberculata* and *Cassia Gaudichaudii*, which may have been under cultivation.

From the first old reef, which seems to lie near where the contour of 40 feet is located on the topographical map, the surface slopes gradually down to the sea, successive reef formations may be noted. On some portions of the plain, particularly toward the east, the surface has sufficient soil for the cultivation of sugar-cane, and in other places sisal has been planted, but west from Ewa Mill and from about a half mile south of the Oahu Railway and Land Company's tracks to the sea, the surface is covered with a growth of glue, algaroba and scrubby lantana, in places quite dense, but generally a straggling growth on account of the scanty rainfall. This region is utilized to some extent as rough pasture for cattle and many colonies of bees are maintained where the algaroba trees are denser and larger.

Among the growth of algaroba and glue are the scanty remnants of the lowland flora which furnish a refuge for a remnant of the old lowland fauna of insects. Among these are a variety of *Myoporum Sandwicense*, *Erythrina monosperma*, sandal wood, *Acryanthes splendens*, *Capparis Sandwichiana*, *Portulaca villosa*, *Sida*, and perhaps most important from the entomological point of view, is the *Euphorbia*, which Mr. Forbes considers a variety of *E. multiformis*. It is to this plant which *Neoclytarlus euphorbiae* and some other lowland endemic insects are attached.

This *Euphorbia* is a low, freely branching shrub which has a short trunk, rarely more than an inch in diameter, which rapidly disappears into a multitude of branches and twigs,

the whole plant rarely reaching a height of more than two and a half or three feet.

This plant, like others in the locality, has considerable powers for resistance to drought, for here many months may pass between rains. Under such circumstances, the *Euphorbia* may lose its leaves and remain leafless. Branches broken down but not entirely separated from the parent plant may have their wounds closed with the copious milky juice and callous over without dying.

Neoclytarlus apparently does not attack the living plant but only the freshly dead stems before they are too much weathered. It is probable that the conditions prevailing in this region furnish this insect more material to breed in than ever was available before the natural conditions were changed. The season of 1919, having been abnormally dry led to the death of an unusually large number of the plants. Three things were observed killing the plants or putting their branches in condition for *Neoclytarlus* to breed in.

An armoured scale, as yet undetermined, occasionally becomes numerous enough at the base of the plant to kill it. Even if it does not kill the plant it may so weaken it that the immigrant Cerambycid, *Lagocheirus obsoletus* Thomson, may attack the weakened stems. This species frequently attacks the plant and completes its transformations after destroying the main stem and branches while the plant is living, the finer twigs being still green and flowing with the milky juice. The attack, however, ultimately results in the death of the plant and its utilization by the *Neoclytarlus*. Many plants unfavorably situated may be so weakened by drought as to fall victim to these beetles without previous injury by the scale insect. The presence of cattle on this area results in a great deal of mechanical injury through their trampling, many branches being broken off and the whole plant often broken down, yet putting many branches in condition for the *Neoclytarlus* to breed in. Whatever the cause of dying may be, the *Neoclytarlus* utilizes a plant quite thoroughly before it has time to

weather, so as to be no longer attractive to it. They utilize not only the larger branches and trunks but they may be found in the branchlets no more than an eighth of an inch in diameter. They feed first in the bark and sap wood and then make their final borings and pupal chambers deep in the wood where they close themselves in with the finely comminuted wood, as is not uncommon with Cerambycidae. Besides the *Lagocheirus* and the *Neoclytarlus,* the immigrant *Prosoplus haukii* (Fabricius) also attacks the *Euphorbiae* wood and competes with the *Neoclytarlus* for its food The finer branchlets, too small for them to use, are utilized by two or three small Scolytid beetles of the genus *Hypothenemus* or its allies.

The size of the beetles varies greatly, individuals breeding out from the main stem and branches being usually larger than those from the branchlets. Apparently they are also smaller where the wood fed upon has been dried than where it is moister.

The adults mate soon after emerging, within 24 hours, and oviposition begins at once. Mating is frequently repeated, the female ovipositing while accompanied by the male and very frequent mating takes place between the acts of oviposition. One female observed mated more frequently than she deposited eggs and was almost constantly surmounted by one of several males. She was very much averse to leaving the *Euphorbia* wood in proper condition placed with them and when not in copulation was constantly feeling about with the end of her abdomen in search of suitable crevices in which to oviposit. She was observed to oviposit in a patch of shredded wood formed by the larva of *Prosoplus* and on examination three eggs were found. These were fusiform, dull white, approximately .742 mm. long by 318 mm. wide, the end by which they were attached being a little more elongate than the other. The distal end is strongly reticulate, the rest smooth. Apparently the eggs are held in place by some slight cementing material.

In mating the male grasps the female with his front legs, which usually hold her near the middle legs, and walks when

necessary with the hind and middle legs. The tip of the abdomen is bent down in both sexes and after some manipulation the female straightens out the tip of the abdomen, extends the long hidden terminal segment and intromission follows. The male during intromission keeps in constant up and down motion on the hind legs as a pivot bending the head, prothorax, and tip of the abdomen. Separation appears to take place in response to movements of the long last segments of the female in search for suitable places for oviposition.

The combats between the males seemed very mild, males disputing possession of a female with the one in possession being fought away with the hind and middle legs and if persistent to some extent with the jaws. If the male had been in possession for some time, however, he seems often to give up the struggle readily. It was noticeable that at first in a tube containing a large male and several smaller ones and only a single female, the large male was able to keep possession for a considerable time but was finally replaced by smaller ones.

The adults paid no attention to honey placed with them for food. Mating and oviposition continued from early in the afternoon, when they were first placed under observation, until sundown at least, and indeed throughout the next day.

Eggs laid June 13 at about 2:30 p. m. were not hatched on June 16 but were found to have hatched by 10 a. m. June 18 and the young larvae found in the tube where they had been placed, escape from the egg having taken place through a slit in the proximal end. The first instar larva is legless, not unlike the older ones, and the middle of its body, its empty mid-gut constitutes a large airspace.

From eggs laid in the laboratory during July, adults were secured in 52 days, the indoor breeding indicating about two months as the usual time required for the development from egg to adult.

From the branches of *Euphorbia* brought in to breed out

the *Neoclytarlus* many individuals emerged of an immigrant *Hormiopterus* (Braconidae) described on another page as *H. ragrans*. This species attacks the larvae of the *Neoclytarlus* while feeding near the surface and the full grown larvae spin their cocoons in a mass in the borings of the beetle, emerging through a circular emergence hole. This species is generally distributed in the lowlands of Oahu.

From the material of *Euphorbia* attacked were found numerous examples of the immigrant Bethylid *Sclerodermus immigrans* Bridwell which furnished the material for the further studies upon this species published on another page of these Proceedings.

There was also found attached to this species a large species of *Eupelmus*, apparently endemic and undescribed.

Neoclytarlus euphorbiae readily oviposited and bred in the wood of the native species of *Euphorbia* so that a constant and dependable supply of larvae was obtained for use in the studies made of the biology of the species of *Sclerodermus*.

This species is the first characteristic species of the group called *Clytarlus* by Dr. Sharp in the Fauna Hawaiiensis of which the food plant is known which is not attached to one of the legumes, *Acacia koa* or *Sophora chrysophylla*.

The name *Clytarlus* will unfortunately have to be given up for this genus since none of this group were included under the name in the first paper (Trans. Ent. Soc Lond. 1878:206) in which it was employed, the only species there included being *Clytarlus robustus* Sharp=*Plagithmysus pulverulentus* Motschulsky, the type of the genus *Plagithmysus* and *cristatus* Sharp since referred by Dr. Sharp to *Callithmysus*. In order to avoid any further shifting of names, the former species may be designated as the type of *Clytarlus* Sharp 1878 and being thus isogenotypic with *Plagithmysus*, this genus must fall as a pure synonym. *Clytarlus* Sharp 1896 with *fragilis* as type thus is without a name and for it *Neoclytarlus* is suggested. Aurivilius in Coleop. Catal. 29:387, 1912, has merged all the Plagithmysine genera of Sharp into *Plagithmy-*

sus and with the discovery of additional connecting forms much can be said for this course. But whether we consider them as genera or subgenera the groups will still require names.

Neoclytarlus euphorbiae n. sp.

Allied to *N. fragilis* and *N. ultimus* but is less depressed in form and much darker in coloration.

Dull black; coxae, base of tibiae, and femora, and frequently the base of the scape and a band beyond the middle of the hind tibiae, apical 6 or 7 antennal joints and base of others pale testaceous (the apical joints of the antennae more brownish); with rather whitish pubescence on the head, thorax, and abdomen, and on the clubs of the femora; on the elytra the pubescence is absent in two oblique irregular bands, one before the first, and one before the second third of their length, and the pubescence is much thinner near the apices of the elytra. Usually three transverse ridges on the pronotum, the anterior one not so near the margin as in *fragilis;* usually the pubescence is absent on the prominences of the sides of the upper surface of the pronotum forming an irregular longitudinal stripe there.

The apices of the elytra are obliquely truncate within and less rounded than in *fragilis.* Punctures of pronotum and elytra finer than in *fragilis.* Club of femora as in *fragilis,* elytra not particularly elevated near the scutellum.

Male antennae longer, the apical joints much longer than in the female, Last abdominal segment emarginate but less so than in *mediocris* as figured (Fauna Haw. 3: pl. 6 f. 16).

Length of type and allotype: 10 mm.; length of smallest specimens of either sex: 5 mm.

Described from a series of 97 females and 107 males bred from the wood of *Euphorbia multiformis* from Ewa Coral Plain, Oahu, at an elevation of about fifty feet above sea level, June to November, 1919 (Bridwell).

Type male, allotype female, and paratypes in the collection of the Hawaiian Entomological Society. Paratypes in the Bishop Museum, the collection of the Hawaiian Sugar Planters' Association and in the private collections of P. H. Timberlake and of the author.

NOTES AND EXHIBITIONS.

Cryptorhynchus mangiferae.—Mr. Swezey recorded obtaining the mango weevil from mango seeds received from Wai-